May 6, 2016

MEMORANDUM TO: Mark Tonacci, Chief
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

FROM: Gregory Cranston, Senior Project Manager ***/RA/***
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: AUDIT PLAN FOR NUSCALE POWER, LLC PRE-APPLICATION ACTIVITIES ASSOCIATED WITH NUSCALE DOCUMENTS ON RISK INSIGHTS DRAWN FROM THE PROBABILISTIC RISK ASSESSMENT (PROJ0769)

In 2010, the U.S. Nuclear Regulatory Commission (NRC or Commission) provided direction to the NRC staff on the preparation for, and review of, small modular reactor applications, with a near-term focus on integral pressurized water reactor designs. The Commission directed the NRC staff to more fully integrate the use of risk insights into pre-application activities and the review of applications and, consistent with regulatory requirements and Commission policy statements, to align the review focus and resources to risk-significant structures, systems, and components (SSC) and other aspects of the design that contribute most to safety in order to enhance the effectiveness and efficiency of the review process. On May 11, 2011, the Commission issued a Staff Requirements Memorandum approving the NRC staff's proposed risk-informed and integrated review framework (Agencywide Document Access and Management System Accession No. ML111320551). A detailed description of the NRC staff's framework is provided in NUREG-0800, "Introduction - Part 2: Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: Small Modular Reactor Edition," January 2014 ("NUREG-0800, Introduction-Part 2").

As discussed in NUREG-0800, Introduction-Part 2, performance of the risk-informed categorization of SMR SSCs is a key framework activity. In order for the NRC staff to implement the categorization process, the applicant must first categorize SSCs as (1) either safety-related or non-safety-related using the criteria in Title 10 of the *Code of Federal Regulations*, Section 50.2, and (2) either risk significant or not risk significant using risk insights from the probabilistic risk assessment (PRA) and other deterministic factors. Insights

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Prosanta Chowdhury, NRO/DNRL 301-415-1647

from the preliminary NuScale Power, LLC (NuScale) PRA results will assist the NRC staff in gaining an understanding of the applicant's risk categorization of SSCs. The NRC staff states in NUREG-0800, Introduction-Part 2: (1) They expect to receive preliminary results of the categorization activities as they become available from the applicant in the pre-application phase of the NRC staff's review; and (2) The NRC staff will conduct pre-application meetings or audits as necessary to obtain and review the information. The quality and timeliness of applicant's inputs are key to the effectiveness of the NRC staff's pre-application activities.

Conducting this pre-application audit is consistent with the NRC's risk-informed and integrated review framework discussed above. The audit will take place at the NuScale office at 11333 Woodglen Drive, Rockville, Maryland, 20852, on May 11 - 12, 2016. A copy of the audit plan is enclosed.

Project No.: PROJ0769

Enclosure:
As stated

cc: DC NuScale Power LLC Listserv

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Enclosures:
As Stated

cc: DC NuScale Power LLC Listserv

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NuScale Power, LLC

Plan for the Pre-Application Audit of the
NuScale Documents on Risk Insights Drawn from the Probabilistic Risk Assessment

May 11 -12, 2016

Applicant:	NuScale Power, LLC	
Location:	NuScale Local Office 11333 Woodglen Dr., Suite 205 Rockville, MD 20852	
Reviewers:	Lynn Mrowca Mark Caruso Tony Nakanishi	
Project Manager:	Prosanta Chowdhury	
NuScale Contacts:	Steve Pope Steve Mirsky Bill Galyean	
Dates and Times:	May 11, 2016 May 12, 2016	8:30 a.m. - 5:00 p.m. 8:30 a.m. - 5:00 p.m.

Background:

In 2010, the U.S. Nuclear Regulatory Commission (NRC or Commission) provided direction to the NRC staff on the preparation for, and review of, small modular reactor (SMR) applications, with a near-term focus on integral pressurized water reactor designs. The Commission directed the NRC staff to more fully integrate the use of risk insights into pre-application activities and the review of applications and, consistent with regulatory requirements and Commission policy statements, to align the review focus and resources to risk-significant structures, systems, and components (SSC) and other aspects of the design that contribute most to safety in order to enhance the effectiveness and efficiency of the review process. On May 11, 2011, the Commission issued a Staff Requirements Memorandum approving the staff's proposed risk-informed and integrated review framework (Agencywide Document Access and Management System Accession No. ML111320551). A detailed description of the NRC staff's framework is provided in NUREG-0800, "Introduction - Part 2: Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: Small Modular Reactor Edition," January 2014 ("NUREG-0800, Introduction-Part 2").

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preliminary NuScale Power, LLC (NuScale) PRA results will assist the staff in gaining an understanding of the applicant's risk categorization of SSCs.

The NRC staff states in NUREG-0800, Introduction-Part 2: (1) They expect to receive preliminary results of the categorization activities as they become available from the applicant in the pre-application phase of the staff's review; and (2) The staff will conduct pre-application meetings or audits as necessary to obtain and review the information. The quality and timeliness of applicant's inputs are key to the effectiveness of the staff's pre-application activities. Conducting this pre-application audit is consistent with the NRC's risk-informed and integrated review framework discussed above.

Objectives:

The NRC staff's objective in conducting this audit is to obtain risk insights regarding the NuScale design from the current design PRA so as to be able to provide appropriate guidance for NRC reviewers to plan a safety-focused review of the NuScale application for design certification.

Regulatory Audit Scope:

The NRC staff will audit a sampling of documents provided by NuScale that document insights drawn from the PRA. Current documentation for the NuScale PRA includes 125 separate documents. The NRC staff has reviewed the list of available documents and selected the following documents for review during the audit:

ID	Title
17	Probabilistic Analysis of Emergency Core Cooling Valve Reliability
27	Passive Safety System Reliability Study
32	Decay Heat Removal System Notebook
35	Emergency Core Cooling System Notebook
53	Success Criteria for In-Vessel Retention in Reactor Pressure Vessel
54	Success Criteria for In-Vessel Retention in Containment Vessel
66	Low Power and Shutdown Probabilistic Risk Assessment Notebook
67	Probabilistic Risk Assessment for Reactor Building Crane
78	LCC-07T: Charging Line Break Inside Containment with ECCS
88	LCU-03T: Unisolated Charging Line LOCA Outside Containment with No Mitigation
90	LEC-05T: ECCS Valve LOCA with No Mitigation
126	Multi-Module Probabilistic Risk Assessment Notebook
127	Shared System Hazards Analysis

Audit Team:

Members of the audit team were selected based on their detailed knowledge of PRA, their experience in obtaining risk insights from PRAs supporting previous design certification reviews, and their knowledge regarding implementation of the NRC's risk-informed and integrated review framework for SMRs documented in NUREG-0800, Introduction-Part 2.

Name	Title and Organization	Primary Review Responsibility
Mark Caruso	**Audit Team Leader** Senior Reliability and Risk Analyst, PRA and Severe Accidents Branch (SPRA) in Division of Safety Systems and Risk Assessment (DSRA)	PRA documentation; quantitative and qualitative insights from the PRA
Tony Nakanishi	Reliability and Risk Analyst, SPRA	PRA documentation; quantitative and qualitative insights from the PRA
Lynn Mrowca	Chief, DSRA/SPRA	Technical Supervision
Prosanta Chowdhury	Senior Project Manager (PM)	Licensing PM

Audit Activities:

Consistent with the Office of New Reactor's procedure this audit will be closed to public observation similar to the conduct of an inspection. The audit will be conducted by a team of NRC staff members who are knowledgeable in various aspects of PRA. Based on the identified scope, it is expected that the team will spend two consecutive days at the NuScale offices listed above to conduct the audit. An agenda for the audit is presented in Attachment A. The NRC staff resource expenditure is estimated to be less than 160 person-hours including preparation and documentation.

The team will perform the audit at a location that facilitates access to the prospective applicant's documentation of the PRA and risk insights drawn from the PRA. The team members will be assigned to review specific areas as listed above. They will review documentation and discuss questions with the applicant's staff. The audit team leader will communicate specific support requests (e.g., documents to be reviewed or interviews to be scheduled).

Support Materials:

The staff will want to review the documents listed above under "Regulatory Audit Scope," which will be provided by NuScale in their Rockville, Maryland office and in some cases in their electronic reading room.

Special Requests:

Appropriate handling and protection of proprietary information shall be acknowledged and observed throughout the audit.

No security-information is provided.

NuScale personnel to address questions on any of the in-scope documents.

Attachment A

Agenda

The audit will take place at NuScale's office located in Rockville, Maryland. The audit is scheduled to begin on May 11, 2016, and end on May 12, 2016.

Wednesday, May 11, 2016

(8:30AM – 9:00AM)	
Entrance meeting discussion	(NRC/NuScale)
(9:00AM – 4:00PM)	
Audit team members review documentation	(NRC/NuScale)
Audit team members interview NuScale staff	(NRC/NuScale)
(4:00PM – 4:30PM)	
Audit team members meet to discuss findings	(NRC)

Thursday, May 12, 2016

(8:30AM – 3:00PM)	
Audit team members review documentation	(NRC/NuScale)
Audit team members interview NuScale staff	(NRC/NuScale)
(3:00PM – 4:00PM)	
Audit team members meet to discuss findings	(NRC)
(4:00PM – 5:00PM)	
Exit meeting discussion	(NRC/NuScale)